Data Race Detection Using Sequential Program Analysis

Abstract

A concurrent program is analyzed for the presence of data races by the creation of

5   a sequential program from the concurrent program. The sequential program contains

assertions which can be verified by a sequential program analysis tool, and which, when

violated, indicate the presence of a data race. The sequential program emulates multiple

executions of the concurrent program by nondeterministically scheduling asynchronous

threads of the concurrent program on a single runtime stack and nondeterministically

10   removing the currently-executing thread from the stack before instructions of the

program. Checking functions are used to provide assertions for data races, along with a

global access variable, which indicates if a variable being analyzed for data races is

currently being accessed by any threads.